

Assessment 562: Sacramento Ozone Nonattainment Area ROG and NOx Emissions for Rate of Progress Plan

To support development of a 2005 Rate of Progress (ROP) Plan for the 8-hour federal ozone standard in the Sacramento nonattainment area, Ms. Cynthia Marvin requested estimates of motor vehicle ROG and NOx emissions by county subarea for calendar years 1990, 2000, 2002, 2005, 2008, 2010, 2013, 2015, and 2020. The years were selected in consultation with Ms. Brigitte Tollstrup of the Sacramento Metropolitan Air Quality Management District.

For each year after 1990, staff was asked to incorporate new VMT estimates and speed distributions. These new activity data were developed by ARB staff with assistance from the Sacramento Area Council of Governments (SACOG), the Sacramento area air districts, and (for Solano County) the Metropolitan Transportation Commission (MTC), as described below and in the cited documents.

Methodology

Staff used EMFAC2002, v2.2 (Apr03) to estimate 1990 summer ROG and NOx emissions for the Sacramento ozone nonattainment area. The area includes Sacramento County, Yolo County, the Mountain County Air Basin portion of El Dorado County, the Mountain County and Sacramento Valley Air Basin (SVAB) portions of Placer County, the SVAB portion of Solano County, and a southern portion of Sutter County. Staff assumed that southern Sutter County had 18% of the total vehicle population for Sutter County. This number was used in the what-if-scenario (WIS) feature of EMFAC to generate the southern Sutter model runs for 1990 only.

For other calendar years, staff used the EMFAC2002, v2.2 (Apr03) scenario generator to enter the updated activity data. To the extent the calendar year outputs needed for the ROP plan differed from the calendar year data provided by SACOG and MTC, staff interpolated VMT estimates assuming compounded growth rates. Staff did not enter VMT directly into EMFAC2002, but followed the recommended practice of modifying vehicle population in proportion to the VMT change (as discussed in <http://www.arb.ca.gov/planning/sip/emfac2002/revmethods.doc>).

SACOG provided VMT and speeds for calendar years 2000 (March 7, 2005), 2005 (March 16, 2005), 2008 (March 16, 2005), 2013 (December 2004), 2020 (March 16, 2005), and 2027 (March 30, 2005). VMT was adjusted based on an agreement among SACOG, ARB, and affected air districts. The adjustments were made using Caltrans VMT data for base year 2003 from the report, *California Motor Vehicle Stock, Travel and Fuel Forecast, November 2004*, in combination with SACOG VMT growth rates. MTC provided Solano VMT and speeds for calendar years 2000, 2007, 2015, 2025, and 2030 for both the Sacramento and San Francisco Air Basin portions of Solano County. Staff adjusted the VMT using the same method as for the other counties.

For Placer County, ARB split the 2003 VMT into 88% for Placer (SV) and 12% for Placer (MC) per SACOG direction. The same speed distributions were used for both portions of the county.

Speed distributions were provided by both agencies for four separate time periods. The time periods are defined as 6 AM to 9 AM peak (hours 6, 7, and 8), 9 AM to 3 PM midday (hours 9 -14), 3 PM to 6 PM peak (hours 15, 16, and 17), and 6 PM to 6 AM nighttime (hours 0 – 5 and 18 – 23). Staff did not interpolate speed distributions, but followed the standard practice of assigning the next higher calendar year speed distributions to interim years (e.g., apply 2013 speeds to 2010 when 2010 is not provided.) Speed distributions were applied to passenger cars, light and medium trucks (T1, T2, and T3), and motorcycles. Model default speeds were left in place for remaining classes.

Speed distributions were used as provided by SACOG and MTC, except for calendar year 2008. Pursuant to federal conformity requirements, speeds were adjusted to better correlate with the VMT adjustments for that year. The off-model speed adjustments were done for all counties except Solano (SV). The option to adjust Solano was not readily available because the speeds were provided by MTC. However, speed adjustments for this relatively small portion of the nonattainment area were not necessary due to their insignificant effect on emissions. The total impact of the speed adjustments for the other counties in 2008 is less than ½ of 1 percent, for both ROG and NOx.

The file *1_Sacr Area VMT and Speed Adj_ROP_E05_rev3.doc* provides background for the VMT and speed adjustments as well as a detailed description of the methodologies.

[Technical note: In order to preserve model speed entries prepared by staff prior to the VMT agreement, staff copied the input text for the new vehicle populations by vehicle class and pasted this information into the prior versions of the input text that contained speed distributions.]

Results

Summer ROG and NOx emissions and VMT are summarized in the following table, from the file *1Summary_SAC_Nonattain_June05.xls*. Other supporting files attached to this assessment include:

SACMET VMT and Growth Rates plus Adjusted VMT
SacramentoArea_VMT_FINAL_Format_June05_E05.xls.

Adjusted Vehicle Populations
SACOG_veh_pop_June05.xls.

Speed Distributions
SacNonattn_ROP_Speeds_June05.zip

Background and Methodologies for VMT and Speeds Adjustments
1_Sacr Area VMT and Speed Adj_ROP_E05_rev3.doc

Sacramento Nonattainment Area
ROG, NOx, and VMT
June 2005

ROG (tons/day)

County	1990	2000	2002	2005	2008	2010	2013	2015	2020
El Dorado (MC)	9.50	5.81	4.95	4.00	3.39	2.93	2.39	2.11	1.66
Placer (SV+MC)	15.11	10.82	9.42	7.84	6.76	5.78	4.72	4.17	3.42
Sacramento	81.73	41.40	35.23	28.12	23.96	20.88	17.45	15.62	12.59
South Sutter	1.15	0.71	0.60	0.47	0.41	0.34	0.26	0.23	0.17
Solano (SV)	7.83	5.60	4.66	3.63	2.99	2.74	2.38	2.19	1.66
Yolo	11.09	6.37	5.32	4.17	3.64	3.15	2.57	2.27	1.84
Total	126.41	70.71	60.18	48.23	41.15	35.82	29.77	26.59	21.34

NOx (tons/day)

County	1990	2000	2002	2005	2008	2010	2013	2015	2020
El Dorado (MC)	8.97	7.27	6.46	5.22	4.40	3.73	2.86	2.40	1.67
Placer (SV+MC)	15.42	15.45	13.88	11.40	9.50	7.94	5.99	4.98	3.48
Sacramento	100.20	72.23	65.07	52.64	44.33	38.06	29.61	25.03	17.44
South Sutter	1.38	1.19	1.03	0.81	0.70	0.58	0.42	0.35	0.23
Solano (SV)	9.13	9.78	8.87	7.41	6.07	5.40	4.33	3.74	2.39
Yolo	20.96	20.12	17.92	13.88	11.77	9.78	7.14	5.75	3.62
Total	156.06	126.04	113.23	91.36	76.77	65.49	50.35	42.25	28.83

VMT (1,000's)

County	1990	2000	2002	2005	2008	2010	2013	2015	2020
El Dorado (MC)	2,204	3,481	3,599	3,778	4,158	4,278	4,463	4,580	4,885
Placer (SV+MC)	4,148	7,766	8,283	9,128	10,033	10,391	10,950	11,378	12,525
Sacramento	24,774	29,692	30,716	32,319	34,854	35,991	37,764	38,860	41,741
South Sutter	291	444	444	445	521	534	553	580	651
Solano (SV)	2,085	4,171	4,286	4,463	4,794	5,241	5,992	6,551	7,111
Yolo	3,519	5,205	5,378	5,650	6,463	6,693	7,051	7,271	7,857
Total	37,021	50,759	52,706	55,783	60,823	63,128	66,773	69,220	74,770